



Serial No. 10/827,281

IN THE UNITED STATES PATENTS AND TRADEMARK OFFICE

D-1598

Applicant : Masanao Furukawa  
Title : GAS CHROMATOGRAPH  
Serial No. : 10/827,281  
Filed : April 20, 2004  
Group Art Unit : 3753  
Examiner : Ramesh Krishnamurthy

Hon. Commissioner for Patents  
P.O. Box 1450, Alexandria, VA 22313-1450

September 13, 2007

RESPONSE

Sir:

In paragraph 3 the Office Action of July 18, 2007, it was held that claims 1 and 2 (sic. 8 and 9) were rejected under 35 U.S.C. 103(a) as being unpatentable over Fennell et al. in view of Shoji. However, claim 8 is patentable over the cited references, as explained below.

In a gas chromatograph of claim 8, a control valve is provided in a supply path, and differential pressure detecting means is attached to the flow path for detecting a differential pressure between two ends of a flow resistance. Pressure detecting means is attached to the flow path between the flow resistance and the control valve for detecting a pressure thereat. Control means is attached to the control valve, the differential pressure detecting means and the pressure detecting means for carrying out a predetermined calculation based on signals from the differential pressure detecting means and the pressure detecting

means for controlling the opening degree of the control valve so that flow amount or pressure in the flow path can be controlled at a predetermined value by the differential pressure detecting means and the pressure detecting means.

In the invention, it is possible to precisely calculate and control the flow amount and pressure in the flow path by applying a formula (1) and  $p_1$ (a pressure between the flow resistance and the control valve)- $\Delta p$ (a differential pressure between two ends of the flow resistance) in the specification.

In paragraph 3 of the Action, it was held that "Fennell et al. discloses (Fig. 3, for example) a gas chromatograph with a fluid control assembly for controlling flow and/or pressure of gas, said fluid control assembly comprising a flow path, a control valve (70), a pressure sensor (65) connected to the flow path in a gas chromatograph for the purpose of ascertaining the pressure thereat of the gas flowing therethrough and a differential pressure sensor (72) for measuring the pressure drop across the flow resistance (73)."

It was also held that "The patent to Fennell et al. discloses the claimed invention with the exception of explicitly disclosing a first pressure sensor between the flow resistance and the control valve."

However, it is explained at column 7, lines 5-15 of Fennell et al. that "An electronic control circuit 71 forms a closed loop controller by adjusting the drive voltage 40 to valve 70 in response to signal 41. The Central Processing Unit 80 provides control signal adjustment in response to a user's request 46 for a specified flow rate. The CPU also continuously receives the column temperature information on bus 81 and accordingly, by using the known temperature 7 and pressure 42, the CPU is able to compute a temperature correction signal and pressure set point which is sent

to the pressure controller 78. The pressure controller 78 adjusts the vent 79 to control the head pressure 51."

Therefore, the pressure in Fennell et al. is controlled by adjusting the vent 79 connected to the flow path at the downstream side of the valve 70. The control of the pressure of Fennell et al. is entirely different from that of the invention. Fennell et al. does not disclose the first pressure sensor between the flow resistance and the control valve, nor the control system of the pressure of the invention.

In regard to Shoji, it was held that "Shoji discloses a flow control arrangement wherein a first pressure detecting means (21) is located upstream of a resistance (3) for the purpose of providing the inlet pressure to the control means."

In the invention, the pressure detecting means is attached to the flow path between the flow resistance and the control valve. Although the pressure detecting means 21 in Shoji is located upstream of the resistance 3, the pressure detecting means 21 is NOT located between the flow resistance and the control valve.

In Shoji, the control valve 5 is located downstream of the resistance, so that the control valve 5 can control a flow amount, but can not control a flow pressure because a control valve lowers a pressure and makes it impossible to control a flow pressure at the sample introducing part.

In Shoji, the pressure sensor is not located as in the present invention, and the flow amount can not be controlled as in the present invention.

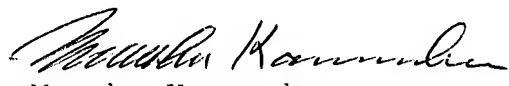
Since Shoji has the pressure sensor in the system, the pressure sensor in Shoji may be combined with the structure of Fennell et al. However, in Fennell et al., the pressure is controlled by adjusting the vent 79. Therefore, the combination of Fennell et al. and Shoji does not disclose the control of the

pressure and flow amount of the invention. Claim 8 of the invention is patentable over the cited references.

Reconsideration and allowance are earnestly solicited.

Respectfully submitted,

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